CAR PLATE TENDERING IN MALAYSIA

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I certify that all the support and assistance received in preparing this project paper and the entire source abstracted have been acknowledged in this stated project paper.

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ABSTRAK

Ini adalah kajian empirikal yang pertama untuk mengkaji faktor penentu harga untuk memenangi plat kereta. Maklumat terperinci tender plat kereta seperti profil demografi pembida (umur, bangsa dan jantina) dan harga tender dan tawaran premium diperoleh daripada Jabatan Pengangkutan Jalan Malaysia (RTD atau JPJ) bagi negeri Kedah pada 2011 hingga 2013. Data unik in membolehkan saya mengukur kesanggupan membayar pembida berdasarkan kepercayaan tahyul dan penglihatan nombor yang menarik. Nombor plat kereta membolehkan kajian menjadi lebih baik berdasarkan kesanggupan pengguna untuk membayar kerana nombor plat kereta tidak mempunyai nilai intrinsik. Lebih-lebih lagi tidak ada pasaran sekunder di Malaysia untuk plat kereta dipindah milik. Saya mendapati menyokong hipotesis di mana nombor "8" dalam plat kereta dikaitkan dengan 9.4% premium untuk memenangi harga tawaran manakala nombor "4" dalam plat kereta akan mengurangkan harga tawaran sebanyak 10.4%. Masyarakat Cina menganggap nombor "8" sebagai nombor bertuah kerana ia sama dengan perkataan "Kekayaan" atau "kemakmuran". "4" bertanda tidak baik atau bermakna dengan perkataan "mati" atau "kematian". Saya juga mendapati sokongan hipotesis menarik di mana plat visual menarik yang dijual pada premium yang ketara berbanding dengan plat lain. Sebagai contoh, plat kereta digit satu dan dua adalah 181% dan 42.4% lebih mahal daripada plat kereta digit bukan satu angka.

Kata kunci: tahyul, terperinci, plat kereta, perbezaan visual, harge bida, permium

ABSTRACT

This is the first empirical research examining the determinants of car plate winning price. Detailed car plate auctioning information such as bidder demographic profile (age, race and gender) and bid price and bid premium are obtained from the Road Transport Department of Malaysia (RTD or JPJ) for the state of Kedah during 2011 to 2013. Capitalizing on this proprietary dataset, I attempt to quantify bidders' willingness to pay for superstition believes and visual appealing numbers. Car plate numbers offer a good laboratory test to consumers' willingness to pay since car plate numbers have no intrinsic value. More so in Malaysia where there is no secondary market for car plate where plate numbers are not transferable. I find support for superstition hypothesis where an addition of number "8"to a plate is associated with 9.4% premium in winning bid price while an addition of number "4" to a plate reduces the bid price by 10.4%. Chinese community perceives number "8" as lucky number because it rhymes similarly to the word "prosper" or "prosperity". "4" is bad for it rhymes similarly to the word "die" or "death". I also find support for visual appealing hypothesis where visually appealing plates are sold at the significant premium as compared to other plates. For example, single and double digits car plates are 181% and 42.4% more expensive than a non-single digit car plate

Keywords: superstitions, auction, car plate, visual difference, bid price, premium.

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter discuss about the overview and background of car plate tendering in Malaysia, problem statement of the study, research objectives, significance of the study, scope and limitations of the study and organization of the thesis.

1.1 Overview and Background of Car Plate Auctioning

Attractive car plate (known as license plate in the US and Hong Kong) numbers could be a symbol or self-expression tool to show off power, status wealth of its owner. As society become more affluent, people are more willing to pay for special car plates which are a form of conspicuous consumption. This is because attractive car plates come at a premium compared to normal car plates. In Hong Kong for example, a license plate with a single number “9” was sold for a hefty HKD 13 million (see Woo et al. 2008). This reflects Hong Kong’s car owners’ willingness to pay for special numbers with purpose to evince his wealth.

Car owners’ willingness to pay excessively for attractive numbers could also due to their superstitious believe towards numbers. There is a universal consensus among Chinese society worldwide that “8” is a lucky number as it rhymes similarly to the word “prosperity” while “4” is considered a bad number as it rhymes similarly to the word “die” or “death”. This is indeed the case in Hong Kong where car plates that contain the number “8” are pricier while none of the high-priced plates contain

number “4” (Woo et al. 2008). Chinese’s preference towards numbers is also reflected in property market. Bourassa and Peng (1999) find that in numerology beliefs affect real estate prices in regions in New Zealand with large Chinese populations. Specifically, they find that room numbers ended with lucky numbers such as number “8” is more expensive. In the same vein, Chau, Ma, and Ho (2001) find that lucky numbers “8” to affect the real estate prices. They document that house in their floor numbers “8” sell for higher prices during property boom.

Malaysian Chinese which constitutes a significant (24.6%) portion of total population in Malaysia share many culture nuances and superstitions as in Chinese in other parts of the world.[1] **Table 1** provides a preliminary evidence to support the claim that Malaysian Chinese also have preference towards number “8” and avoid number “4” as shown by car owners in Hong Kong. The car plate information is obtained from Malaysia’s Road Transport Department which I will elaborate in detail in the next section. **Table 1** shows that car plates with “8” only are majority owned by the Chinese while the opposite is true for “4”. This suggests Malaysian Chinese likes number “8” and dislike number “4”. Moreover, car plates with only number “8” are systematically more expensive than car plates with only number “4”. For example, the average price for a four-digit 8888 car plates is at RM 4427, while a four digit 4444 is priced at RM 2200.

[1] Malaysia is a multiracial society comprising Malays (67.4%), Chinese (24.6%), Indian (7.3%) and other races (0.7%) (Source: Department of Statistics Malaysia).

Table 1: Car plate numbers by races

Car plate numbers	% Chinese car owners	Price (RM)
8	72%	RM 23,966
88	65%	RM 8,659
888	79%	RM 5,097
8888	70%	RM 4,427
4	17%	RM 12,590
44	21%	RM 2,415
444	0%	RM 0
4444	0%	RM 2,200

Special car plate numbers in Malaysia are selling through auction method. An auction is a process of purchase and sale goods or services by offering them up for bid, taking bids, and then selling the item to the highest bidder. Auctions are regarded as the best avenue to find the true value for an asset that is unique, difficult to value and infrequently traded (Cassady, 1967; and Milgrom, 1989). The competitive setting of an auction process often results in higher sales price for the auctioned items. There are four commonly used auction types. The first type auction is called open ascending price auction. Auctioneers start the auction with a reserve price and gradually increase the auction price. At the end of the auction, if no bidder is willing to bid further, bidder with the highest bid price will get the item at his bid price when the auction closes. Ascending bid auction is commonly being practiced to sell single item such as real estate, car, jewelry, antique and etc.

The second type of auction is called open descending price auction where the auctioneers start with a high price, and then gradually lower the auction price, until a participant is willing to accept the auctioneer's price and buy goods. This type of

auction is normally been used when there are multiple homogenous item being sold.

The third type of auction is first price sealed bid auction where bidders submit their bid simultaneously (during the bidding period) without knowing other bidders' bid price. Bidder with the highest bid will get the auctioned item. This type of auction widely practiced for foreign exchange, refinancing credit, military procurement and construction contracting.

The fourth type of auction is second price sealed bid auction which is similar to the first sealed bid auction. However, that the winning bidder pays the second highest bid price instead of his/her winning bid price. This type of auction is rarely been practiced except in the African country for foreign exchange.

Special car plate numbers are sold through first price sealed bid auction (FPSB). In this type of auction, all bidders must submit sealed bids to road transport department (RTD) during the auction period which last for two weeks. Therefore, no one knows other bidders' bid price. Each bidder only allows a bid. The highest bidder pays the price of they submitted and will get her/his car plate number.

1.2 Problem Statement

2014 is a challenging year for Malaysia. Malaysia's economy is clouded with the tapering of the US quantitative easing program which leads to capital outflows from Asia including Malaysia. At the domestic front, Malaysia's economy fundamentals are eroding by the rising costs of living, build-up in inflationary pressure, high level of government debts and persistent fiscal deficit since 1998. The focus of budget 2014

concentrates on reducing the deficit to 3.5% of the GDP (2013: 4%). Government departments that represent a revenue center were called to assist by improving their services or products.

Road Transport Department (RTD) is one of those departments where a total of RM2.9 billion revenue was generated in 2010 (RTD 2010 annual report). Despite its role as one of the government's income contributors, no research has been conducted to understand the auctioning process and the determinants of car plate winning bid price in Malaysia. An understanding of winning car plate determinants is important as it allows RTD to identify car plate numbers that receive strong demand and design appropriate marketing strategies to further maximize this particular segment of recurring revenue. The use of car plate sales to raise government revenue is not new. In Hong Kong, the personalized car plates were introduced in 2006 with purpose to improve Hong Kong government's fiscal budget deficit following the outbreak of SARS in 2003 and the economic downturn from 2002 to 2004.

A secondary motivation of this research is to shed light to the economic value of cultural nuances and superstition on product pricing. This is particular relevant in Malaysia's multi-cultural setting where it is important for managers and marketers to go beyond the rudimentary knowledge of the do's and don'ts of different races in Malaysia. Focusing on car plate number auctions, this research attempt to assign an economic value to these nuanced differences.

1.3 Research Questions

The two main research questions for this project paper are:

(1) Who are the winning bidders?

(2) What are the determinants of auction winning-bid price?

1.4 Research Objectives

The two main research objective for this research paper are:

(1) To determine the demographic profile of winning bidders such as race, age and gender.

(2) The examining the determinants of car plate winning price with a focus on the superstition and visual impact of plate numbers.

1.5 Significance of the Study

This is the first study that looks at the determinants of car winning-bid price in Malaysia. Car plate auctioning provides a good laboratory to test the economic value of cultural values, norms and superstitions because car plate number has no intrinsic value and incur trivial production costs (Woo and Kwok, 1994). The first attribute implies that any price variation between bidders must be a reflection of a car plate's appeal to one's vanity and superstition. The second attribute of car plates eliminate the causal relationship between price and cost, hence, allows us to attribute our findings to the effects of vanity and superstition. Findings on the determinants of

winning bids allow RTD to further refine their classification of “Popular numbers”. Presently, a total of 424 numbers are classified as popular with a flat reserve price of RM300 (similar with ordinary numbers). The results will pinpoint popular numbers that deserve a higher reserve price, thus, increase RTD’s revenue base.

1.6 Scope and Limitation of the Study

The data used for this study are limited and applicable to car plate auction in the Kedah state of Malaysia. Therefore, this study results may not be generalizable to other states in Malaysia. Future research could consider expand the sample size by including states with high Chinese population such as Penang, Johor and Kuala Lumpur.

1.7 Organization of the Thesis

The remainder of this research is organized as follows. Chapter two reviews the extant of literature. Chapter three describes the data and method used in this research. Chapter four presents empirical results. Chapter five is this study draws the conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter provides the institutional background of car plate auctioning in Malaysia. This is followed by the review of literature on superstition and how superstition affects the price as shown in the prior research. The objective of this section is to develop the expected relation between independent variable and dependent variable (winning bid price).

2.1 Institutional Background

The sole institution in charge of the issuing of car plate number is the Malaysian Road Transport Department (Its Malay acronym is JPJ). Car plates in Malaysia consist of state or territory prefixes (the first alphabet in car plate), followed by alphabetical and number sequences. For example, Kuala Lumpur, Penang and Kedah are the states having initial prefix W, P and K respectively. State RTD is responsible for the auctioning of car plates registered with the state. For example, Kedah RTD is in-charge of the auctioning of car plate bearing initial "K" prefix.

Car plate numbers are broadly divided into two types, ordinary plates and special plates (see **Appendix 1** for the types of special plate numbers). Ordinary car plates do not go through the auctioning process and are sold to new car owners on a first come first serve basis at RTD counter on a flat price of RM300. Special plates are sold to new car owner through auctioning. These plates are unique because of its rarity, easily

recognizable features and reflect the owners' wealth or status. RTD categories special car plates into three mutually-exclusive types: (a) golden numbers (numbers 1-10); (b) attractive numbers (consist of 37 numbers); (c) popular numbers (consists of 414 numbers) (See **Appendix 1** for details). Special plates make up of 4.6% of total plates in a prefix (series) and carry a reserve price (minimum price) of RM10,000, RM2,000 and RM300 respectively for golden, attractive and popular numbers.

2.2 Auction Process

Special plates are sold through first price sealed bid-auction format in which bidders submit a bidding form to RTD. Bidder with the highest bid will get the car plate number at his/her bid price. The process is, briefly, as follows. When a new prefix (series) (e.g. KDK 1-9999) is released for sale, interested bidders are invited to submit their bids by filling up the tendering form (M.V. 10) indicating their desired plate number and the bid price. The auction on the golden, attractive and popular numbers all in, 461 plate numbers will be opened for two weeks. By noon on the closing date of the auction, bidders must deposit their sealed bid together with a deposit equivalent to 50% of the bid amount. Thus, in a sealed-bid car plate auction, a bidder would not know what other bidders offer for the car plate number. The only available information provided by RTD during the auction process is the last series auction results that show the names of successful bidders and their respective wining-bid price and car plate numbers.

Successful bidder must settle the 50% balance of bid price within a month and must

complete the car plate registration process on a vehicle owned by the bidder in three months period. Failing to adhere to this rule would lead to the forfeit of the deposit and car plate number. Successful bidder is also prohibited from selling the car plate to outside parties, a move to curb the trading of car plate for profits. In addition, individual bidders are only allowed to own a maximum of three car plate numbers in a year. The effectiveness of these rulings is yet to be tested as evidence by the existence of companies advertising their car plate inventory for sales (www.platemaster.com.my. www.myplate.com.my).

2.3 Auction Theories

In economic theory, the consensus of the auction is: "Auction is a collective (auction group) determine to resources (usually is a scarce resource) price and allocation process". Mcfee (1987) defines auction as an explicit set of rules of market institution to determining resource allocation and on the basis of bids price form the market participant. The market participants include the sellers and bidders. In other words, the auction is a simple and clear economic system to solve the problem of resource allocation and pricing. Auction is the interaction and influence between supply and demand. Therefore, become more directly reflect market demand, and ultimately maximize value of the goods, while saving time of resources allocation and improve the efficiency of resource allocation.

Vickery (1961) was the first to propose independent private value model (IPVM), the assumptions of this model is that the good being auctioned has a different value

for each bidder, each of whom knows the value of the object with certainty. In other words, a bidder's willingness to pay is different and is not affected by other bidders who bid for the same object. Vickery also discussed about English auctions (open ascending bid auction, the highest bidder win and pay the highest price), second-price sealed bid auction (bidder set sealed bids and simultaneously nobody know the bid of another bidders, also the highest bidder win and pay the second-highest bid price), the Dutch auction (open descending bid auction, the highest bidder win and pay the highest price) and first-price sealed bid auction same like second-price sealed bid auction, however, pay a price equal to the highest bid). These four auction mechanism referred to as "the four standard auction mechanism." Vickery (1961) found that the four standard auctions will bring equal auction revenue, and its resource allocation result is exactly the same, this principle is known as "revenue equivalence theorem".

Riley and Samuelson (1981) proved that if there are any two of kinds of auction mechanism exist, the auction result is always the allocation of resources to offer the highest bidder and the lowest bidder expected profit is zero. For bidder, both auction mechanisms to generate expected profit are equal. At the same time, they believe that any one of these four standard auction mechanism, if set the optimal reserve price, these can become the best auction price mechanism.

Maskin and Riley (1985) designed an optimal auction mechanism that included the setting of reserve price and collection costs of participate in the auction and a fee for unsuccessful bidders.

Coppinger, Smith and Titus (1980) compared the performance of the four standard

auction mechanisms. The results show that: (1). For measuring the highest bidder wins the auction frequency proportion, resources allocation efficiency of the English auction is the best and the average transaction price is higher than the optimal price. The transaction price performance phenomenon tends densely distributed in the vicinity of the optimal prices. (2). In the Dutch auction, the price often deviate from the optimal price distribution and the average transaction price may be lower than the English auction price or may be almost the same. (3). In the second price sealed-bid auction, there are a considerable number of bidders offer bid price below estimate price. However, this finding is not statistically significant. (4). In the first-price sealed-bid auction, the average transaction price is lower than the optimal price, but has significant statistical sense.

Budde and Minner (2014) consider sealed-bid auctions and thus are able to implement a first-price auction that leads to lower purchasing prices in push contract than in an open auction format. In push supply theory, the retailer know amount of demand after their has to decide about the quantity of purchasing. Through the implementation of contract compliance using an external option, rather than selecting a service level in pull contracts, and can create competition between suppliers always lead to higher expected profits of retailers. In pull supply theory, the retailer delay the order until their know demand. Suppliers bear the risk of all the demand, when demand remains uncertain, it is necessary to build capacity.

Hansen (1988) considers the influence of endogenous quantities in procurement auctions under deterministic, price-sensitive demand. He shows that the auctioneer

always likes a first-price to a second-price auction and that the first-price dominates. The second price auction from the perspective of considering the total economic surplus.

Maskin and Riley (1984) show that about risk neutral seller and risk averse buyers, their preference first price auctions. However, Matthews (1987) studies from the perspective of bidders which buyers' preferences for auction depends on their absolute risk aversion measures. Buyers think that first price auctions is the best when they have reduce absolute risk aversion. Waehre et al (1998) find that if independently distributed of buyers' private signals, all risk averse seller preferences first price auction.

Budde and Minner (2014) find that in order to minimize the procurement price, the retailer selected the first price sealed bid auction rather than a second price sealed bid auction. If a social planner who is to maximize the total profit of the supply chain, the pull contract is preferred because it will lead to supply chain efficiency and auction it does not matter. Thus, lead to the same profits as does an open bidding format like the English auction under pull contracts first-price and second-price sealed-bid auctions. Sourcing by a push contract and using a first-price sealed-bid auction leads to a positive bidding.

Wiggans (1989) show that a bidder's utility depends not only on profits, but also on the various forms of auctions specific regret. For example, the winner of the first-price sealed bid auctions usually pay more than the highest bid of competitors, thus leaving money on the table. In this case, the winner may well regret overpaying;

this is refers to “money left on the table”. In this case, the winner’s price may be lower than some losing bidders willingness to pay. In this case, the loser has missed the opportunity to win the object at a favorable price and may regret the bid is too low.

Wiggans (1989) finds that if bidders in a first price auction weight loser’s regret more heavily than the winner’s regret, then they should bid higher than the risk-neutral Nash equilibrium, and the opposite is true if winner’s regret weight more than loser’s regret.

Cox et al. (1982) explains the observed “overbidding” in the repeated setting with a theory, this theory allowed constant relative risk aversion preference, extending Vickery (1961) risk neutral Nash equilibrium bidding theory.

The relationship between overbidding in the repeated first price auctions and risk aversion received major attention by the experimental community (Harrison 1992; Cox et al. 1992; Friedman 1992; Kagel and Roth 1992; Merlo and Schotter 1992).

Ivanova and Salmon (2006) find that when the bidders can choose to enter either the first price sealed bid auction or an ascending bid auction, more of the bidders enter ascending bid auction can be explained by risk aversion. Similarly, these authors did not provide any specific explanation for this behavior, but they do mention regret as a general possibility. More specifically, the loser’s regret may explain this result. However, the risk of both types of auctions exist to bidders, only the first price sealed bid auction cause regret and a concern for loser’s regret could move the entry equilibrium toward one with more bidders entering the ascending auction.

Marechal and Morand (2011) show that less risk averse bidders reduce his markup when he even less risk averse when the asymmetry in risk aversion between the two bidders is large enough. If this is the large asymmetry, the seller's expected revenue increases as bidders become more asymmetric risk aversion.

Isaac and Walker (1985) compared to the private value sealed bid auction, this feedback is given only on price, to other auctions. In addition, after the auction, bidders were informed about the losing bids. They found that prices generated under the full feedback condition are lower than prices generated with limited feedback.

Ockentels and Selten (2005) show that the experimental first price sealed bid auction with private value in which the losing bids is provided yield lower revenues feedback than auctions where this feedback is not provided. In addition, the bid is often higher than the equilibrium predicted for risk neutral bidders, the latter observation restructuring, areas to avoid risks, reasonable bidding is constant feedback on the losing bid. Ockentels and Selten (2005) recommend that the concept of impulse balance equilibrium is based on learning theory of direction and into the more concerned about social issues.

Strategic equivalence is the strongest equivalent concept, means that the revenue equivalence, without the need for a particular hypothesis. In contrast, Nakajima (2011) finds that give up any hypothesis, such as the private value, risk neutral and bidder's types independent distribution, the equivalent of revenue generated between the first price (or Dutch) and second price (or English) auction (such as Myerson 1981 and Riley and Samuelson 1981) failed. Even the equivalence of revenue between the

second-price and the English auctions rely on the hypothesis of private values. However, the revenue equivalence between the first-price auction and the Dutch auction does not depend on a variety of assumptions.

Coppinger et al. (1980) and Cox et al. (1982) show that the Dutch auction yields a lower revenue than the first price auction in laboratory experiments. However, Riley (1981) who conducted field experiments by selling magic cards in internet auctions reported that the Dutch auction results in higher revenue than the first price auction. In addition, Katok and Kwasnica (2008) by falling price is sufficiently slow in the Dutch auction that get the same results in laboratory experiment. These two experiments show that the first price auction tends to result in lower revenue than the Dutch auction when the price decline at a slower speed.

Although the reserve price is confidential in practice (e.g., Elyakime et al., 1994; Ashenfelter, 1989), non-standard assumptions need to prove their use on a theoretical basis. In the regular distribution of symmetry independent private value auction environment, risk-neutral buyers and sellers of risk neutral, the optimization mechanism is implemented by any standard published reserve price auction with the best choice (Myerson, 1981). Secret reserve price may be used to increase the participation of second-price auction common values (Vincent, 1995), to reliably signal information in repeated second price auctions (Horstmann and LaCasse, 1997), to induce more aggressive bidding in first-price auctions with risk-averse bidders (Li and Tan, 2000), and in first-price and second-price auctions with reference based utility (Rosenkranz and Schmitz, 2007). Rosar (2014) finds that committing to a first

price auction rules early, however, to maintain the correct set up a secret reserve price later on may be the optimal for seller.

Simmons (1996) find that in a first price sealed bid discriminatory auction with winners, the surplus gained through the seller from constant relative and constant absolute risk-averse bidders. In these cases, the risk aversion is high enough such that the seller gains all the surpluses. It is also suggests that relatively constant risk averse bidders is equivalent to a risk neutral bidders with a private values transformed distribution.

2.4 Superstitions

Superstitions are beliefs that are inconsistent with the known laws of nature or with what is generally considered rational in a society (American Heritage Dictionary 1985). Strevie (1972) defined a superstition as "when you believe in things that you don't understand, then you suffer, superstition ain't the way". Superstition is anyone believes that is based on myth, magic, or delusion. Superstitious beliefs dating back thousands of years, and continues to the present (Jahoda, 1969; Vyse, 1997). Darke and Freedman (1997) find that superstition can be invoked to fend off bad luck. People believe in luck, as they tend to view good luck as stable. Beliefs in good luck were shown to be distinct from potentially related constructs such as optimism, self-esteem, fortunate or general life satisfaction. Fudenberg and Levine (2006) provide an economic explanation as to why how superstitions can persist even if people are rational and which types of superstitions are more likely to persist. They

theorize that superstitious beliefs can persist if the probability of being exposed as untrue is sufficiently low. If there is always some chance of a bad outcome when following superstition and some chance of a good outcome when not following superstition, the individual might never realize that the belief is untrue and persists in the superstition. Fudenberg and Levine's (2006) theoretical model implies that under the rationality assumption, superstitions can persist in equilibrium and in turn do affect the behavior of people. The above implication is verified with extant of papers that showed how superstitions change the allocation of economic resources discusses in the next section of this research.

The literature has also documented factors that lead to the prevalence of superstitious believes. Case et al. (2004) conduct a series of investigations that the relationship between use of superstition strategies and the sense of control. They consistently find a positive relationship between the possibility of failure and the use of superstitious beliefs. Case et al. conclude that the more salient the failure is, more people use superstition strategy to explain the consequences of failure.

Freud and Brebner (2012) find that all forms of superstitious behavior related to uncertainty. However, uncertainty hypothesis predicts that human will rely more heavily on superstitions when they attribute the consequences of a situation to chance or luck. Burger & Lynn,(2005) proposed that hypothesis of uncertainty leads to the superstitious behaviors expression. The human were convinced that luck could influence behavioral expressions. The probability would be greater if the human would take part in superstitious rituals. Wright and Erdal, (2008) find that under

uncertain circumstances which the hypothesis state, human will try to get control of the situation by engaging in superstitious behavior.

Abbott and Sherratt (2011) found that superstitions are more likely when the cost of the superstition is low, relative to the perceived benefits. Additionally, when the prior beliefs of individual suggest that the superstition is true. They also find that the uncertainty of personal influences the probability of superstition, but the nature of these effects relies on the prior beliefs of individual.

2.5 Empirical Evidence

2.5.1 Car plate numbers

Studies on car plate (known as license plate in the US and Hong Kong) auction is scarce. To the best of knowledge, there are only four academic papers that examine the determinants of car plate winning bids using Hong Kong data (Ng, Chong and Du, 2010; Chong and Du, 2008; Woo et al. 2008; and Woo and Kwok, 1994). This is partly due to the proprietary nature of the auction data and the fact that not many countries adopt auction mechanism to sell car plate numbers. In the US for instance, a vehicle owner can opt for a personalized license plate by paying a fixed annual fee to the government. The personalized license plates allow vehicle owners to choose the sequence of symbols that will appear on his or her plate (Biddle, 1991). Craft (2002) showed that the average annualized price of a personalized license plate in 1997 sample was USD24.13. In Beijing, China, the auction of car plate numbers that rhyme "luckiness" is banned so as to discourage superstitious belief. In Singapore, new car

plates are assigned automatically by the government though there exists secondary market for special car plate numbers in the country. In Hong Kong and the UK, license plates are sold through an open auction in which the auctioneer starts the auction with a reserve price and bidders will raise their bid in each subsequent bid. The highest bidder will get the auctioned plate number.

This research is closely related to Ng, Chong and Du (2010), Chong and Du (2008), Woo et al.(2008) and Woo and Kwok (1994). These papers look into how a car plate is priced in Hong Kong using the same series of data but in different periods and empirical specifications. The papers came to the same conclusion that controlling for variables known to affect license plate pricing, superstitions are found to be significantly related to winning bids. Specifically, the number "8" is associated with plates with significantly higher winning bids, while number "4" is associated with plates with significantly lower winning bids. Ng, Chong and Du (2010) for instance show that a 4-digit plate with one extra "8" was sold 63.5% higher on average, while the same plate with one extra "4" was sold 11% lower on average (both relative to number 7). The authors further document that bidders tend to be more superstitious during the bad time where they tend to discount a bad number even more in bad times. Woo et al. (2008) reveal that the number "13" which is perceive bad luck to the westerners has no significant impact on the winning bids implying that Chinese superstitions are different from their western counterparts.

2.5.2 Other evidence on the value of numbers

The literature has also documented the economic value of "lucky" and "unlucky" numbers across different cultures. Kramer and Block (2009) document that westerners are more risk-adverse on Friday the 13th than other neutral dates in an experiment study. Ng, Chong and Xu (2010) report an anecdote where roughly 80% of the elevators produced by Otis Elevator Company (world's largest elevator manufacturer) have no 13th-floor button. This underscoring the importance of superstitions on business practices in the western world.

Superstitious believe also exists in property market scene where buyers are find to pay premium for certain lucky numbers. Bourassa and Peng (1999) find that houses ending with a "lucky" number, i.e. "8" are more expensive in the certain areas in New Zealand with large Chinese population. Chau, Ma and Ho (2001) find that apartments with an "8" in their floor numbers sell for higher price during property boom in HongKong. Specifically, an apartment located on 8th floor was sold at 2.8% premium as compared to an apartment located on 4th floor that was sold at 0.38% discount. Agarwal et al. (2014) find that Singaporean Chinese are less likely to buy units and on floors with numbers ending in 4. Consistent with prior research discussed above, the prices of residential units with numbers ending in 4 exhibit a discount of 1.1% while those with numbers ending 8 exhibit a premium of 0.9%.

In stock market, newly listed company on the Hong Kong Stock Exchange often choose a listing number that is considered especially "lucky" such as 3988 (Bank of China Limited) and 1818 (Zhaojin Mining Industry Company limited) (see Woo et al.

2008). “1”, “3”, “9” and “8” are considered lucky numbers by Mandarin-speaking Mainland China for they rhyme “sure”, “longevity”, “forever” and “prosperity” respectively.

Wong and Yung (2005) show that Many Chinese people carefully timed their children's birth year. They believe that "Year of the Dragon" will bring their children good fate. Ling (2003) find that Singaporeans not only dislike number 4 but also they dislike numbers 7, 8, 13, 37 and 69. These numbers are negative number because they think that these numbers can bring them bad luck. The Japanese do not like the numbers 4, 3 and 5 because Japanese do not like odd numbers; Korea do not like number 4 as its rhymes are similar to the word “die”. Therefore, an apartment located on 4^{th} floor was called F floor. In Malaysia, number 0, 4 and 13 is taboo in their mind. “0” and “13” are considered unlucky number by mandarin-speaking Mainland china as they rhyme “nothing” and “lost”. Numbers 13 and 39 is also regarded as taboo by Afghans. Pakistanis think number 13 and 420 are unlucky number.

Ang’s (1997) survey of Chinese consumers find that those brand names that contain lucky numbers and letters (e.g. A8) are considered more favorable than those containing unlucky letters and numbers (e.g. F4). Simmons and Schindlers (2003) who conduct analysis on advertisement in Chinese majority markets, i.e. China, Hong Konh and Taiwan find number is “4” is underrepresented while number “8” is overrepresented number in advertised price.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter discusses data and variables used in this research. Car plate auction data was obtained from the Road Transport Department (RTD) in Kedah State. The final dataset contain 2,882 winning bids on the back of 5,566 submitted bids between 2011 and 2013. The car plate auction data is novel because it consists of plate number, auction year, the winning-bid price, reserve prices, number of bid submission for a plate number and the bidders' identity (race, age and gender). The last two information is absent from the previous studies.

3.1 Research Strategies

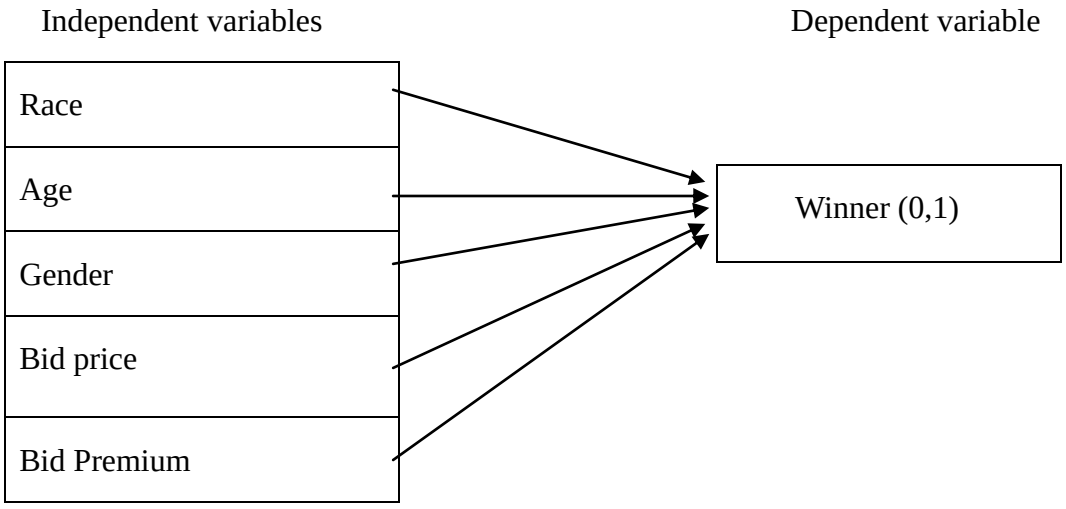
The first stage of this research is to determine the profile of winning bidders using a logistic regression. The dependent variables is dummy variable taking value of one for winning bidders and zero otherwise. Bidder profile (race, gender, age and gender), bid price and bid premium (bid price-reserve price) are used as the independent variables.

The second stage of this research is to identify the determinants of winning bid price. The winning bid price is the highest bid price for an auctioned plate number. Bidder profile, letter prefix, number of digit in a plate, number patterns and number counts of "0" to "9" are used as the independent variables. Following Ng, Chong and Du (2010), this research paper includes variety of different combination of number

patterns to disentangle differences in visual appeal from the effect of superstitious. The bidder race, gender of bidder, plate digits, plate series and number patterns are measured by using the dummy variable. Bidder age and number counts of “0” to “9” do not use the dummy variable.

3.2 Research Framework

3.2.1 The profile of winning bidders



3.2.2 The Determinants of Winning Bid Price

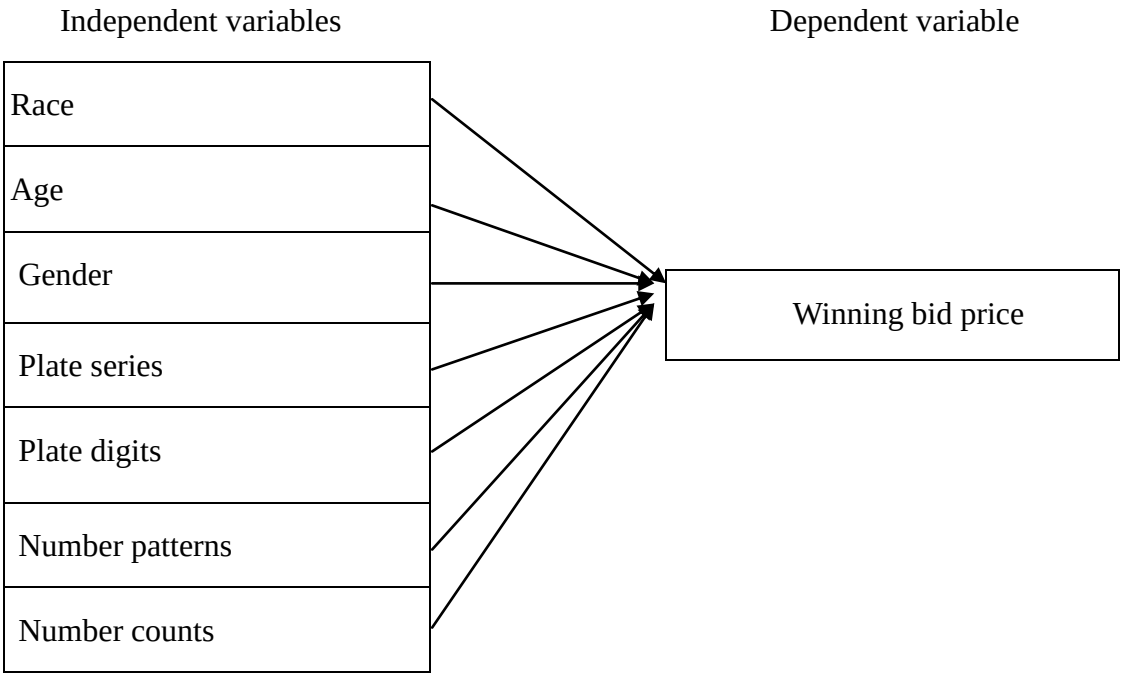


Table 3 Definitions of independent variables

Variables	Description	Dummy?	Example
Bidder Profile			
Chinese	Dummy variable equals to one if bidder is a Chinese and zero otherwise.	Y	
Indian	Dummy variable equals to one if bidder is an Indian and zero otherwise.	Y	
Malay	Dummy variable equals to one if bidder is a Malay and zero otherwise.	Y	
Age	Bidder's age	N	
Male	Dummy variable equals to one if bidder is a male and zero otherwise.	Y	
Bid Price	Bid price in ringgit	N	
Premium	Bid price minus reserve price	N	
Prefix			
KCW	Dummy variable equals to one for care plate with KCW prefix and zero otherwise.	Y	
KCX	Same as above	Y	
KCY	Same as above	Y	
KDA	Same as above	Y	
KDB	Same as above	Y	
KDC	Same as above	Y	
KDD	Same as above	Y	
KDE	Same as above	Y	
KDF	Same as above	Y	
KDG	Same as above	Y	
KDH	Same as above	Y	
KDJ	Same as above	Y	
KDK	Same as above	Y	
KDL	Same as above	Y	
KDM	Same as above	Y	
KDN	Same as above	Y	
KDP	Same as above	Y	
KDQ	Same as above	Y	
Number of digit			
1-digit	Dummy variable equals to one if the car plate contains one digit and zero otherwise.	Y	*KDM1,KDJ8*

2-digit	Dummy variable equals to one if the car plate contains two digits and zero otherwise.	Y	*KCW21,KDA88*
3-digit	Dummy variable equals to one if the car plate contains three digits and zero otherwise.	Y	*KCX131,KDG222*
4-digit	Dummy variable equals to one if the car plate contains four digits and zero otherwise.		*KCX1311*
Number counts			
num1	The count of number "1"	N	
num2	The count of number "2"	N	
num3	The count of number "3"	N	
num4	The count of number "4"	N	
num5	The count of number "5"	N	
num6	The count of number "6"	N	
num7	The count of number "7"	N	
num8	The count of number "8"	N	
num9	The count of number "9"	N	
num0	The count of number "0"	N	
Number patterns			
n100x	Multiple of 100	Y	*KDE300,KDN800*
n1000x	Multiple of 1000	Y	*KCY2000,KDP4000*
symmetric	Symmetric sequence	Y	*KDH565,KDK1221*
aabb	2 pairs in parallel	Y	*KDF1122,KDB5566*
abab	2 pairs mixed	Y	*KDC2323,KDR7878*
aa	2 of a kind	Y	*KCW11,KDQ99*
aaa	3 of a kind	Y	*KDD333,KDL666*
aaaa	4 of kind	Y	*KDF5555,KCX9999*
n13	"13","131","1313"	Y	*KDH13,KCY131*

3.3 Bid price by the types of car plates.

The average bid prices by year and types of plates are provided in **Table 3.1.** The average bid price for all special car plate increase slightly from RM3,027 in 2011 to RM3,327 in 2013. As expected, the average bid price for golden numbers of RM27,653 is significantly higher than attractive and popular numbers of RM4,869 and RM689 respectively. The average price for 1 digit golden plate is higher than 2 digits golden plate. The average price for 2 digits attractive plate is higher than 3 digits and 4 digits attractive plates. Similarly, the average price for 2 digits of popular plate is higher than 3 digits and 4 digits popular plate.

Table 3.1 Average bid price (RM) by year and types of plates

		All types			1-d	2-d	2-d	2-d	3-d	3-d	4-d	4-d
Year	All	G-N	A-N	P-N	G-N	G-N	A-N	P-N	A-N	P-N	A-N	P-N
2011	3,027	26,314	4,895	684	27,657	14,900	5,406	947	4,340	547	3,711	477
2012	3,040	27,570	4,968	708	28,852	12,180	5,678	990	4,371	541	3,277	488
2013	3,327	29,086	4,748	670	31,034	12,204	5,505	912	3,865	505	3,405	408
All-Y	3,124	27,653	4,869	689	29,174	13,148	5,539	951	4,191	533	3,440	463

Note: G-N: Golden number, A-N: Attractive number, P-N: Popular number,1-d: 1-digit, 2-d: 2-digit, 3-d: 3-digit, 4-d: 4-digit, All-Y: All year.)

3.4 Hypotheses Development

Malaysia car plate auction data provides us the unique opportunity to quantify the economic effects of cultural values, norms, attitudes and superstitions influences of different ethnic groups in Malaysia. Following Woo et al. (2008), we control for a set of dummy variables that characterize the car plate numbers. These characterizations lead to our two main hypotheses:

H1: Higher price will be paid, ceteris paribus, for visually appeal car plate numbers.

H2: The greater is the proportion of number "8" in a plate- the higher will be its price, ceteris paribus; and the greater is the proportion of "4" in a plate- the lower will be its price.

Prior studies revealed that there is a significant relationship between visual appealing numbers and price variation. Smith (2011) finds that there is a statistically significant correlation between the intuitive style and superstitious reasoning. The intuitive style was found to be related to superstitious reasoning and paranormal beliefs and may therefore impact on reasoning and thinking in ways that are at odds with scientific understandings of causality. The visually impact of a car plate is captured by plate series, plate digit, number patterns and number counts of "0" to "9" shows the visual differences.

As discussed in the literature review section of this research paper, there is a significant relationship between superstitions and price variation. Superstition plays a role in explaining price variation even after controlling for factors that known to affect pricing. The specific type of superstitions that is the focus of this research is the belief that a number that rhymes similarly to something is good or prosperity ("8") would bring good luck to the owner or something is bad or death would bring bad ("4") luck to the owner.

3.5 Methodology

The first stage of this research is to identify the winning bidders profile by estimating the probability of winning bid using a logistic regression model. The regression model is specified as follow.

$$Winner\ (1,0) = \alpha + \beta_1(Chinese) + \beta_2(Indian) + \beta_3(Age) + \beta 4(Male) + \beta_5(Lg\ Bid\ Price) + \varepsilon_t \quad (1)$$

Winner= 1 if the bidder is a winning bidder

=0 otherwise

Note that this study also replace Lg Bid Price with Lg Premium as robustness check. Malay dummy is the base variable and is drop from the regression to avoid dummy variable trap.

The second stage of this research is to estimate determinants winning bid price using OLS regression. The full regression model is specified as follow.

$$lg(bidprice) = \alpha + \beta_1(Chinese) + \beta_2(Indian) + \beta_3(Age) + \beta_4(Male) + \beta_{5\text{-}22}(Prefix) + \beta_{23\text{-}25}(No\ ofdigit) + \beta_{26\text{-}34}(Numbercounts) + \beta_{35\text{-}43}(Numberpatterns) + \varepsilon_t \quad (2)$$

Note that the definitions of the variables are as in **Table 3.**

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

The purpose of this chapter is to analyze the winner profile and the determinants of winning bid price using logistic and ordinary least square regressions respectively. The main hypotheses are visually appeal hypothesis and superstition hypothesis.

4.1 Data and Summary Statistics

Table 4.1 provides summary statistics for variables used in the logistic regression. The average bid price is RM3,948, with a maximum of bid price is RM 102,000 and a minimum of bid price is RM300. The average of bid premium is RM 2,374 range from RM 0 to RM92,000. Bid premium is measured as the difference between bid price and reserve price. The oldest bidder aged 85 while the youngest is 17 years old. Malay, Chinese and Indian bidders account for, respectively, 66%, 31% and 3% of the total bidders. The proportion of male and female bidders is 69% and 31% respectively.

Table 4.1: Summary Statistics for 5,566 Bids

	Mean	Std.Dev.	Minimum	Maximum
Bid price (RM)	3,948.05	9,046.66	300	102,000
Premium (RM)	2,374.41	6,960.14	0	92,000
Age	39.76	11.17	17	85
Male	0.69	0.462	0	1
Chinese	0.31	0.463	0	1
Indian	0.03	0.175	0	1
Malay	0.66	0.474	0	1

Table 4.2 shows the correlation coefficient for variables in Table 4.1. The situation in which the independent variables are highly correlated among themselves is referred to as multicolinearity (Hair et al., 2006). This is not a concern for the logistic regression in the next section because variance inflation factor (VIF) for the two models are less than 2. According to Gujarati (2009), the model may face collinearity problem if VIF value is larger than 10.

Table 4.2 Correlations matrix

	Winner	Malay	Chinese	Indian	Age	Male	lgBidprice	lgPremium
Winner	1							
Malay	.120**	1						
Chinese	-.114**	-.931**	1					
Indian	-.024	-.251**	-.121**	1				
Age	.062**	-.017	.009	.025	1			
Male	-.024	.016	-.026	.027*	.123**	1		
lgBid price	-.135**	-.380**	.363**	.071**	.053**	.028*	1	
lgPremium	-.088**	-.314**	.309**	.036**	.041**	.044**	.833**	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4.3 Variance Inflation Factors (VIF)

Variables	VIF	Variables	VIF
Chinese	1.183	Chinese	1.129
Indian	1.031	Indian	1.022
Age	1.018	Age	1.017
Male	1.018	Male	1.019
Lg bid price	1.174	Lgpremium	1.116

4.2 Winner profile

Table 4.4 reports results on the determinants of bidder profile. The dependent variable is *Winner*, a dummy variable equal to one for successful bidder and zero otherwise. Models 1 controls for the *Race*, *Age*, *Gender* and *Lg Bid Price*. Model 2 replace *Lg Bid Price* with *Lg Premium*. Model 1 and Model 2 results show the positive sign of age of bidders. If the age of bidder go up by 1 percentage point, the winning probability will increased by 1.3%. This indicates that older people are more likely to be a winner.

The coefficients for *Chinese*, *Indian*, *Male*, *Lg Bid Price and Lg Premium* are negative and statistically significant. Model 1 shows that the winning bid price is dropped by 35%, 32% and 14% if the bidder is a *Chinese*, *Indian* and *Male* respectively. This could be explained by the majority the fact majority of the bidders are Malay (66%) in my sample. The negative and significant coefficients for *Lg Bid Pric*e or *Lg Premium* implies that most of the winning bids are low priced plates where high priced plates are rare.

Table 4.4: The Determinants of Bidder Profile

Explanatory variables	Dependent variable: Winner	
	Model 1	Model 2
Intercept	0.9059***	0.1010***
	(5.1128)	(0.8235)
Chinese	-0.3498***	-0.4455***
	(-5.5141)	(-7.1848)
Indian	-0.3176**	-0.4116***
	(-1.9584)	(-2.6305)
Age	0.0135***	0.0129***
	(5.4719)	(5.2470)

Male	-0.1422**	-0.1444**
	(-2.3911)	(-2.4295)
Lg Bid Price	-0.3763***	
	(-7.4347)	
Lg Premium		-0.1180***
		(-4.0321)
No of Obs	5,566	5,566
McFaddenR^2	0.0217	0.0165

4.3 Data and Summary statistics

Table 4.5 provides summary statistics for variables used in winning bid regression in the next section. The average winning bid price is RM3,216 which range from RM250 to RM102,000. The average of bid premium is RM1,918, range from RM 0 to RM92,000. The average age of winner bidder is 41 years old. The oldest winner bidder aged is 85 years while the youngest aged 18. Malay, Chinese and Indian bidders account for are 71%, 26% and 3% of the winning bidders respectively. Male and Female account for 68% and 32% of the winner bidders, respectively.

Table 4.5: Summary Statistics for 2,882 Bids

	Minimum	Maximum	Mean	Std. Deviation
Bid price	250	102,000	3,126.41	7,921.493
premium	0	92,000	1,917.51	6,124.219
Malay	0	1	.71	.452
Chinese	0	1	.26	.438
Indian	0	1	.03	.163
Male	0	1	.68	.466
Age	18	85	40.45	11.263

4.4 The Determinants of Winning Bid Price

Table 4.6 provides results for the determinant of winning bid price. The dependent variable is the nature log of winning bid price. Models 1-5 report the coefficient estimates from OLS (ordinary least squares), t statistics are reported in parentheses, while ***, ** and * refer to statistical significance at 1%, 5% and 10% levels, respectively. The average VIF for models 1-5 ranged from 1 to 11 indicating that multicollinearity is not a concern for the regression models.

Table 4.6 The determinant of winning bid price

Explanatory	Dependent variable : bid price				
	Model 1	Model2	Model 3	Model 4	Model 5
Intercept	2.7222***	2.7997***	2.5798***	2.3599***	2.4989***
	(72.7473)	(49.2685)	(61.0318)	(11.9697)	(16.9439)
Chinese	0.3532***	0.3632***	0.252***	0.2186***	0.0576***
	(16.0548)	(16.2041)	(15.4911)	(13.3949)	(5.0796)
Indian	0.4165***	0.4145***	0.3000***	0.2775***	0.0825***
	(7.0572)	(6.9606)	(7.0051)	(6.6429)	(2.9245)
Male	0.0654***	0.0632***	0.0237	0.0166	0.01541
	(3.1562)	(3.0459)	(1.5863)	(1.1423)	(1.5833)
Age	0.0035***	0.0036***	0.0022***	0.0023***	0.0025***
	(4.0595)	(4.1777)	(3.5871)	(3.777)	(6.1901)
KCW		-0.2036***	-0.142***	-0.131***	-0.0696**
		(-3.3853)	(-3.2883)	(-3.1138)	(-2.4738)
KCX		-0.0501*	-0.0271	-0.0254	-0.0171
		(-1.6701)	(-1.259)	(-1.2099)	(-1.2183)
KCY		-0.0261	-0.0134	-0.0133	-0.0086
		(-1.2218)	(-0.8723)	(-0.8913)	(-0.8646)
KDA		-0.03**	0.0003	0.0017	0.0139**
		(-2.1743)	(0.0279)	(0.1766)	(2.147)
KDB		-0.0074	-0.0083	-0.0089	-0.01423**
		(-0.5447)	(-0.8522)	(-0.9335)	(0.0064)
KDC		-0.0174	-0.012	-0.0103	-0.0131**
		(-1.5678)	(-1.5087)	(-1.3254)	(-2.5211)
KDD		-0.0013	0.0049	0.0043	0.0005
		(-0.1395)	(0.7462)	(0.6769)	(0.1072)
KDE		-0.011	-0.0088	-0.0085	-0.0092**

	(-1.4001)	(-1.5567)	(-1.5480)	(-2.4922)
KDF	-0.0095	-0.0118**	-0.0127**	-0.0102***
	(-1.2947)	(-2.226)	(-2.4815)	(-2.9871)
KDG	-0.0114*	-0.0085*	-0.0086*	-0.0082***
	(-1.7895)	(-1.8534)	(-1.9278)	(-2.7616)
KDH	-0.0067	0.0046	0.0059*	0.0106***
	(-1.3809)	(1.3248)	(1.7368)	(4.6393)
KDJ	-0.0004	-0.0036	-0.004	-0.0069**
	(-0.0676)	(-0.8648)	(-0.9684)	(-2.5389)
KDK	-0.0086**	-0.0024	-0.001	0.0026
	(-1.9664)	(-0.7555)	(-0.2953)	(1.2749)
KDL	-0.0056	-0.0053*	-0.0055*	-0.0063***
	(-1.2424)	(-1.6614)	(-1.7632)	(-3.0062)
KDM	-0.0078*	-0.0049*	-0.0041	-0.0036*
	(-1.9087)	(-1.6584)	(-1.4206)	(-1.8661)
KDN	-0.0006	0.0024	0.003	0.0031*
	(-0.1631)	(0.9132)	(1.1552)	(1.7962)
KDP	-0.0058	-0.0039	-0.0038	-0.003*
	(-1.567)	(-1.4722)	(-1.4861)	(-1.1746)
KDQ	-0.0037	-0.0018	-0.0011	-0.0012
	(-1.1038)	(-0.7647)	(-0.4743)	(-0.7681)
1-digit		1.6164***	1.803***	1.8116***
		(50.4806)	(12.2532)	(15.4105)
2-digit		0.3755***	0.5037***	0.424***
		(22.9055)	(5.1645)	(4.6796)
3-digit		0.143***	0.1978***	0.0249
		(7.1483)	(3.7737)	(0.6574)
num1			0.1301***	0.0562*
			(2.6584)	(1.7024)
num2			0.0299	-0.0164
			(0.6118)	(-0.4997)
num3			0.0464	-0.0318
			(0.9456)	(-0.9600)
num4			-0.0501	-0.1037***
			(-1.0066)	(-3.1040)
num5			0.026	-0.0517
			(0.5305)	(-1.5658)
num6			0.0223	-0.0412
			(0.4560)	(-1.2512)
num7			0.0442	-0.0463
			(0.9017)	(-1.4024)
num8			0.0943*	0.0273
			(1.9339)	(0.8297)
num9			0.0701	-0.0180

				(1.4381)	(-0.5470)
num0				0.0388	0.0398
				(0.7908)	(1.2000)
n100x					0.0988
					(1.4489)
n1000x					0.0211
					(0.2738)
symmetric					0.0282
					(0.4715)
aabb					0.0558
					(0.8847)
abab					0.0596
					(0.9574)
aa					0.7906***
					(38.4955)
aaa					0.9768***
					(15.4319)
aaaa					0.9198***
					(14.0244)
n13					0.3211***
					(6.1962)
No of Obs	2,882	2,882	2,882	2,882	2,882
R2	0.1016	0.1095	0.5416	0.5681	0.8082

Model 1 is the base model controlling for winning bidders' profile. Model 2 is an expanded model controlling for 18 prefix with KDR prefix as the base variable. Model 3 controls for the number of digit in a car plate with 4-digit plate as the base variable. Model 4 controls for number counts while Model 5 controls for number patterns. The key variable of interest for this research paper is *num8* and *num4* where these variables to be positive and negative, respectively with winning bid price as hypothesized in the superstition hypothesis. This research paper find support for this hypothesis where *num8 (num4)* is positive (negative) and significantly related to winning bid price in Model 4 (5). The coefficient of *num8 (num4)* implies that an increment of one additional "8" ("4") to a car plate results in 9.4% (10.4%) increase

(decrease) in winning bid price. However, the coefficient of *num8 (num4)* is not insignificant in Model 5(4). The coefficients for *num1* is positive and significant indicating Malaysian Chinese also view number "1" as lucky number as their mandarin speaking counterparts in Mainland China.

Since the regression models have controlled the visual appealing of plate numbers through various controls for number patterns, this study argues that these results are due to bidders superstition believes towards numbers.

This research paper also find support for visual appealing hypothesis where plate numbers of the same kind of numbers, i.e. *aa aaa* and *aaaa* and car plates with lesser digit numbers are consistently priced at a premium as compared to other car plate numbers in the sample. Specifically, car plate with numbers in *aa, aaa, aaaa* are sold at a premium of 79%, 98% and 92% compared to other car plate numbers. In the same vein, car plates with only 1-digit, 2-digit and 3-digit are sold at 181%, 42.4% and 2.5% premium compared with 4-digit plates.

Turning to bidder profile, OLS regression of model 1 results shows that there is positive relationship between winning bid price and *Chinese*, *Indian, Age* and *Male*. This indicates that Chinese and Indian bidders have higher preference over special plate number as compared to Malay bidders. Chinese and Indian bidders are more willing to pay for special car plate numbers than Malay bidders. Older people are willing to pay a higher price for special car plate.

For male bidders, they are willing to pay more money for special car plate than female bidders. Of the 18 car prefix in the models, only 5 prefix (KCW, KDF, KDG,

KDL, KDM) are find to be significantly different from the base prefix, i.e. KDR. Interestingly, all this prefix carry negative coefficient implying that a KDR plate is more expensive plates with any of the above prefix.

Overall, this section provides support to the superstition and visual appeal hypotheses postulated in this research papers. Particularly, we find that an increasing of number “8” in a car plate tend to increase bid price while the opposite is true for number “4” which is consistent with superstition hypothesis. This finding is also in line with existing car plate research using Hong Kong data such as Ng, Chong and Xu (2010) and Woo et al. (2008). Plate numbers which are rare and visually unique (low digit numbers and plate with number of a kind) are sold at a high price. This finding is consistent with visually appeal hypothesis.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.0 Introduction

This chapter is divided into sections. Section 5.1 provides conclusion of previous chapters. Section 5.2 explains implications. Section 5.3 discusses the recommendations for future research.

5.1 Conclusion

The purpose of this study is to investigate the significance of the seven variables which is race and age of bidder, gender of bidder, plate series, plate digit, number counts form 0 to 9, and number patterns on car plate winning bid price. The data for this research paper is collected form the Road Transport Department (RTD) of Malaysia Kedah. A total of 2,882 special car plates were offered for sales during 2011 to 2013. The regression analyses of the data using OLS and Logit estimation methods. Based on the literature review, these studies have shown that superstitions and visually difference are impact on bid price of car plate. This research paper finds that most of finding is match with the previous researcher's findings.

This research paper shows most of winning bidders are Malay and older people are more likely to be a winner. This research also finds a positive relationship between race, age of bidder, gender of bidder and winning bid price. Chinese and Indians cares more about the car plate number, thus are more willing to pay a higher price for car plates. More successful bidder are older people, therefore, older people spend more

money on the car plate. Male bidders pay more money for car plates as compared to female.

There is a significant relationship between number superstition and bid price. A lucky number can bring good luck that is sold at premium, but an unlucky number can bring bad that is sold at discount. Also, the visually difference has significant impact on bid price. For example, plate pattern of *aa,aaa,aaaa,* these bid price is higher than other plate pattern, and car plate with only *1-digit, 2-digit and 3- digit* sold at higher premium compare with *4-digit* plates.

5.2 Implications

This study quantifies the effects of visual appealing and superstition on car plates. We find that both effects are indeed matters in explaining car plate prices with visual appealing effects exert a stronger impact on prices than superstition effects. This finding is valuable to both policymakers and practitioners alike.

To policymakers, this research help them singled out car plate numbers that are received strong demand from the bidders. In particular, they could consider increase the reserve price for plate numbers that carry the same number of its kind, e.g. *"aaaa".*

To business people, this research shows them consumers' willingness to pay for superstitions and artistic value of a product. They need to be culturally sensitive to consumer's behavior when designing their marketing strategies in order to maximize the sales.

To potential bidders, this research help them gauge the market value of the special car plates. This information is important they are better informed during the auction process.

5.3 Recommendations for Future Research

The study is useful for other researchers since this is one of the very few studies that used. However, future research should include expand the data to cover other states in Malaysia as well as car plate sales in other Asian countries to test whether the results obtained here could be generalized to other countries.

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